overfeeding, however much it may affect weight, has probably little effect on adult stature, though it may hasten growth and thus enable a man to reach precociously his predestined stature." Of great importance, however, are the internal secretions of the gonads, the thyroid, the pituitary body, and other endocrine glands. The degree of activity exhibited by these glands is a variable and heritable constitutional character, but it is also modifiable by severe diseases and accidental extrinsic influences. In two ways, therefore, stature is affected by the degree of activity of the ductless glands, and "experience points strongly to the conclusion that internal constitutional factors are more important than the ordinary environmental differences."

The following are among the most important conclusions which Dr. Davenport has reached. One of the factors determining variation in stature is variation in the age of the onset of puberty. Parents deviating from the mean in the same direction have on the average less variable offspring than those of one short and one tall parent. The offspring of two tall parents are less variable in stature than those of two short parents. When the stature of both parents is very much above or below the average, the children tend to repeat it, especially in the direction of tallness. When the parents are much below the average the offspring regress towards mediocrity, but there is no (or little) filial regression when the parents are much above the average. It seems that parents of all statures are somewhat heterozygous (or "impure") as regards their peculiarity, but there is evidence in favour of the theory that in tall parents the gametes are more nearly homogeneous (in lacking most of the shortening factors) than are those of "short" parents. Shortness seems to be due to certain positive factors which inhibit the growth of various parts. It appears that "growth-as-a-whole" factors are present, but there is a large degree of independence in the variability of the four segments of stature (head and neck, torso, thigh, and lower leg); and this makes impossible any simple "Mendelian" laws of the inheritance of stature as a whole.

There is evidence that peculiarities in the separate segments of stature are independently heritable, and the combinations of types with different proportions (though similar in total stature) may give curious, but readily intelligible, results. The proportional shortness of any segment depends on more than one shortening factor —just how many cannot be said. It is probable that in all forms of dwarfing there are multiple dominant inhibiting factors. In the case of gigantism in both parents all the children are tall; "this indicates that the factors for tallness are mostly recessive—probably due to the absence of inhibitions to prolonged growth." "Persons of similar stature tend to marry each other; and extremes are more particular in this respect than those of medium statures."

These are the most important conclusions of this interesting piece of work, but it is evident that "the classic topic of the heredity of human stature" must be subjected to further analysis with even larger bodies of data. In admitting the provisional character of his investigation, Dr. Davenport says: "If the work has done nothing more than prove, what might have been anticipated, that the apparent blending inheritance of stature is due merely to the presence of multiple factors, it may be justified."

## NOTES.

IN various parts of the country camouflaged houses and hangars and vessels are to be seen by those who have eyes to see, and it was stated officially on January 14 that the Admiralty had tested many methods of disguising mercantile shipping. One of these methods is to paint the ship with various quaint combinations of different colours. But this does not appear to have proved much of a success, though we know in Nature of conspicuously patterned creatures, such as the hoopoe, which are, in certain situations and poses, endowed with what amounts to a garment of invisibility. Another method, well illustrated by a model in the British Museum (Natural History), depends on what is sometimes called Thayer's law, the announcement of which was first made in NATURE of April 24, 1902, by Prof. E. B. Poulton. A further illustrated description of the principle was given in an article in our issue of October 27, 1910. Mr. Abbott H. Thayer, an American artist, was one of the first to recognise that a high degree of invisibility is conferred on certain birds by the simple adaptation of being dark above and whitish below. He took two wooden decoy ducks, and placed them against a sandbank. One was coloured like the sand, or coated with sand; the other was coloured on its upper parts darker than the surrounding sand, and graded below to pure white. At a short distance the first was still clearly visible, but the second was quite lost against its background. The first bird was revealed by the dark shadow below it; the second was made invisible because the light lower parts were neutralised by the shadow, while the dark upper parts were toned down by the strong direct light. The result is technically described as obliteration by counter-shading. Some modification of this experiment has been tried on ships by differential painting, but this device has not proved so successful as had been hoped by those who knew how obliterative it was in some birds and fishes. On some other quite different line, it is said, the Admiralty has discovered a system of camouflage which will go far to baffle the eyes of submarines.

IT would appear from some recent statements by the Ministry of Munitions that the production of mineral oil from native sources is engaging the close attention of the Department of Mineral Oil Production. It may be inferred that boring for petroleum in Great Britain has not yet been attended with any success, and so far the opinions of the large body of British geologists who were opposed to these boring operations appear to have been justified. Oil has, of course, continued to be produced in Scotland by the distillation of the so-called oil shales of the Carboniferous Measures, and it appears that the output of this oil is being pressed to the utmost. It has been known for many years that the Kimmeridge shales of Liassic age in the south of England are in places quite rich in oil, and a succession of companies has attempted in the past to create there a shale-oil industry on the same lines as in Scotland; all these attempts proved, however, to be commercial failures, and it would seem that no better fate has attended the more recent efforts of the Ministry of Munitions. The latter has accordingly turned its attention to the production of oil by the low-temperature distillation of coal by practically the same process as that patented by Dr. James Young in 1850, a process that was worked on a commercial scale for a good many years until it was displaced by the far cheaper production of natural petroleum in the United States. To-day, however, when commercial results are in a sense less important than technical ones, this process may well be revived in this country, and it would seem that this is being done, coals that are especially suited to it, such as cannel coal, being selected for the purpose. No doubt experiments are being tried in many other directions, but there are obvious reasons why the nature of these, or the results obtained by them, should not be made public at present.

WITH the continuance of the war the production of zinc from ores mined in the Empire has undergone a satisfactory development. For a time much of the ore could not be absorbed in the reduction works until the necessary plant had been erected and was in running order, the labour mobilised and trained, and the transport organised. During this period some of the Australian Broken Hill concentrates were shipped to the United States of America and smelted there. Great Britain raised her smelting capacity, but rather slowly. Canada has made a notable contribution of metallic zinc in the last two years, and is now producing substantial amounts. Some of this is obtained by the electrolytic process. Considerable sources of electric power are available in Tasmania, and it is not surprising to learn that Broken Hill concentrates are shipped for treatment there. Satisfactory results have recently been reported from the electrolytic plant erected at Risden. This plant has a daily capacity of fifteen tons, which, it is said, can be increased tenfold, corresponding to a potential production of more than 50,000 tons per annum. The power is obtained from the States Great Bear hydroelectric installation. That electrolytic zinc is now being produced in considerable quantities in various parts of the world is likely to prove of much importance to industry.

AN important scheme for the reorganisation of the Board of Trade is summarised in a memorandum (Cd. 8912) issued on January 17. The memorandum embodies the results of consultation with an informal committee consisting of Sir Clarendon Hyde, Sir Algernon Firth, Mr. Mackinder, M.P., and Mr. C. T. Needham, M.P., and its recommendations are supplementary to the action already taken in the formation of the Joint Department of Overseas Trade, recently set up by the Board of Trade and the Foreign Office. It is proposed that the work of the Board of Trade should be organised in two main divisions: (i) the Department of Commerce and Industry, and (ii) the Department of Public Services Administration. The Department of Commerce and Industry will comprise sections dealing with (*a*) commercial relations and treaties; (*b*) Overseas trade; (*c*) home industries and manufactures; (*d*) industrial property (including the Patent Office); (*e*) industrial power and transport; (*f*) statistics; and (*g*) general economics. There will be a strong Advisory Council attached to this department, and it is proposed to constitute representative trade committees for each important group of trades. Certain changes and rearrangements will apply to the work of the branches of the Board of Trade falling within the Department of Public Services Administration. The work will, as before, involve the administration of a number of statutes, such as the Railway Regulation Acts, Merchant Shipping Acts, General Harbour Acts, Electric Lighting Acts, Weights and Measures Acts, Companies Acts, and Bankruptcy Acts. The department will also deal generally with the services concerned (railways, shipping, electric lighting, etc.). The two joint permanent secretaries are Sir Llewellyn Smith, K.C.B., and Sir W. F. Marwood, K.C.B.

IN an article on modern methods for the storage of coal in *Engineering* for January 18, Mr. G. F. Zimmer states that storing coal under water is probably the most expensive method, but undoubtedly the most economical in the long run. About the year 1905 the first experiments made in this country on this method proved to be perfectly successful, as the coal thus stored suffered no deterioration. There was a prevailing idea at the time that only sea-water would preserve coal thus, but it was found afterwards that the coal would keep equally as well in fresh-water. Underwater storage prevents loss of heating value, and is not accompanied by deterioration in physical properties, such as slacking. The water retained by the coal upon removal is substantially only that held by adhesion or capillarity. The first large plant of this kind was installed at Chicago, where 14,000 tons of coal are stored under water. The largest installation has recently been erected by the Duquesne Light Company at Pittsburg, and consists of a pit 800 ft. long, 150 ft. wide, and 25 ft. 6 in. deep, with the sides sloping at 45°. The capacity is 100,000 tons of coal. It is interesting to note that the coal recovered from the battleship *Maine*, which had been submerged for fourteen years, showed on analysis a heating value (a moisture, ash, and sulphur-free basis) of 8588 calories. It is believed that this was coal from the New River District, West Virginia, and if this be the case the deterioration in fourteen years was about 160 calories, or 1·9 per cent.

SIR ANTHONY A. BOWLBY has been appointed Hunterian orator of the Royal College of Surgeons of England for the year 1919.

PROF. V. GIUFFRIDA-RUGGERI, professor of anthropology in the University of Naples, has been elected an honorary member of the Royal Anthropological Institute of Great Britain and Ireland.

WE learn with much regret that Miss Ethel Sargant, F.L.S., hon. fellow of Girton College, and president of the Section of Botany of the British Association for the Birmingham meeting, 1913, died at Sidmouth on January 16, at fifty-four years of age.

THE annual general meeting of the Institute of Metals will be held on Wednesday, March 13, and Thursday, March 14. The presidential address will be delivered and several papers read and discussed on March 13, whilst further papers, including the fourth corrosion report, will be read on the following day.

AT the annual general meeting of the Royal Meteorological Society held on January 16 the Symons Memorial medal, which is awarded biennially for distinguished work in connection with meteorological science, was presented to Dr. H. R. Mill, director of the British Rainfall Organisation. The council for 1918 was duly elected, with Sir Napier Shaw as the new president.

MR. J. S. SELLON, whose death in London on January 18, at the age of eighty-one, we regret to record, was the fifth son of Capt. W. B. Sellon, R.N.

At an early age Mr. Sellon joined the well-known business house of Messrs. Johnson, Matthey, and Co., assayers and refiners to the Bank of England and Royal Mint, metallurgists, etc., founded by his uncle, Percival Norton Johnson, in 1822. He played a prominent part in the researches and industrial developments connected with the platinum and other groups of rarer metals, with which the name of his firm is closely associated; indeed, the now numerous and important commercial applications of platinum and its allied metals may be said to be chiefly due to the initiative and efforts of himself and his co-workers, George and Edward Matthey. During the concluding quarter of last century he also took an active share, both in the fields of technical discovery and industrial development, in the then new sphere of electrical engineering, and was associated with Faure, Brush, Swan, Lane-Fox, Volckmar, and others in their early work on electric lighting and storage.

WE regret to note that the death of Mr. Frederic Eliot Duckham is recorded in *Engineering* for January 18. Mr. Duckham was born at Falmouth in 1841, and his early engineering experience was obtained in the construction of docks. He was appointed engineer-in-chief of the Millwall Dock in 1868, and steadily advanced in the service of the dock authorities, becoming general manager in 1899. He held the dual appointment until his retirement in 1905, when he was elected a director, a position he held until the property was taken over by the Port of London Authority. His name is best known on account of his successful inventions, of which the most important was his pneumatic grain elevator, which saved the Millwall Company 8000*l.* per annum. Mr. Duckham became an associate of the Institution of Civil Engineers in 1875, and was elected a full member in 1878; he was awarded the Telford gold medal and two premiums for papers read before the institution.

AT the meeting of the Illuminating Engineering Society on January 15 an address was delivered by Mr. L. Gaster on "Ten Years of Illuminating Engineering: its Lessons and Future Prospects." Mr. Gaster recalled that it was just ten years since the proposal to form an Illuminating Engineering Society was made. A feature of its work had been the opportunities afforded for co-operation with other societies; for example, in dealing with such matters as school, library, and street lighting. While the war had naturally restricted their activities in some fields, in others they had found new channels of usefulness; he might mention their special work on the illuminating value of star-shells and parachute lights, and researches on the brightness of radium paint for gun-sights, to which allusion had been made in the presidential address. It was desirable that better facilities should be provided for co-operation between scientific and technical societies and the State. Much useful information might be obtained in the present exceptional circumstances; fuller data were needed on the effect of inadequate lighting in causing street accidents and the influence of various conditions of lighting in Government factories on the quality and output of work. In order to illustrate how such data might be obtained, several tables were presented relating to accidents in streets and factories enabling information to be acquired on a uniform and systematic plan so as to trace the relation between such accidents and inadequate illumination.

WEATHER conditions in 1917 were at many times exceptional, although the mean results for the several elements for the whole year were not very different from the normal. At Greenwich the mean temperature was 49°, which is 0·5° deficient in comparison with the average for previous years. The highest monthly mean temperature was 63·3° in June and July. The warmest day temperatures occurred in June, when the mean was 74·9°, but the warmest nights were in August with a mean minimum reading of 54·3°. The lowest monthly mean temperature was 35·3° in January and February. In April the deficiency of the mean temperature was 4·5°, whilst in May the excess was 4·5°. There were 127 days with ground frost during the year; the greatest number in any month was twenty-seven in December. Rainfall at the national observatory totalled to 25·3 in., which is 1·5 in. more than the average, and 4·5 in. less than the total in 1916. There was an excess of rain in the spring and summer months, and a deficiency in the autumn and winter. The heaviest monthly fall was 4·3 in. in August, and in July the fall was 4·2 in. February was the driest month with 0·8 in. There was precipitation on 163 days, which is thirty days fewer than in 1916. August had twenty-three days with rain, whilst June had only seven, and December eight. Snow was unusually frequent, falling at Greenwich on fifty-one days. January had as many as sixteen days with snow, and the opening month of 1918 bids fair almost to equal it. Duration of bright sunshine for the year amounted to 4·14 hours per day, which is in excess of the normal, and is nearly forty minutes per day greater than in 1916. June was the brightest month, with an average of 7·5 hours per day of sunshine. January was the least sunny, with a daily average of 0·5 hour of sunshine.

IN *Science Progress* for January Mr. J. Reid Moir discusses pre-Palæolithic man in England. He points out that in East Anglia the greatest facilities exist for recovering evidence of this period. He bases the existence of pre-Palæolithic man on the following considerations:—"(1) The discovery in various parts of England of different kinds of flint implements in deposits which are of greater antiquity than those containing the earliest palæoliths. (2) The discovery at Piltdown, in Sussex, of the remains of a very primitive type of human being in intimate association with certain definite Pliocene mammalian forms, and the earliest kind of flint implements known to science." He adds that "the Neolithic and Palæolithic stages in this country are fairly well known, but the vast pre-Palæolithic periods await examination. These periods are fully represented in England, and the flint implements, etc., contained in the deposits laid down during these epochs must be collected and investigated."

IT is an indication of improvement in the political situation of Mexico that, according to the *Mexican Review*, vol. ii., No. 2, the exploration of the famous ruins of San Juan Teotihuacan, which had been suspended during the revolutionary period, has now been resumed under the direction of the Secretary of Fomento, and it is believed that some very interesting and important discoveries will be made. Prescott describes these ruins, with the possible exception of Cholula, as the most ancient remains on Mexican soil. They were found, it is said, by the Aztecs on their arrival in the country, when Teotihuacan, "the habitation of the gods," now a petty village, was a flourishing city, the rival of Tula, the great Toltec capital. The two principal pyramids were dedicated to Tonatiuh, the sun, and Mezlli, the moon. The former, which has recently been restored, is 652 ft. in length at the base, and 182 ft. in height, thus rivalling some of the kindred monuments in Egypt. There is at present no building on the summit, but the photograph accompanying the article shows what seem to be processional roads used for some ceremonial purpose.

WE have received copies of the official tide-tables of the Pacific and Eastern Coasts of Canada for 1918, issued free by the Dominion Department of Naval Service. The eastern tables are based on records varying from seven to twenty years. The Pacific tables are naturally based on shorter series of records, but it is claimed that in accuracy they are superior to the tide-tables for any ports in the Pacific Ocean in America, Asia, or Australia. Next to these Canadian ports is San Francisco, which is based on the longest record at any harbour on the Pacific coast of the United States.

A STUDY of the nationalities of Hungary is of great importance in relation to the Slav claims on that country. In the December (1917) number of the *Geographical Review* (vol. iv., No. 6) Mr. B. C. Wallis has a detailed paper on the subject, accompanied by several small but admirably clear maps, two of which deal with density of population and distribution of nationalities respectively. Mr. Wallis's analysis of the population gives little support to the claim of the northern Slavs, Slovaks, Czechs, and Poles, for union with the southern Slavs by a corridor of territory along the border-lands between Austria and Hungary. The population of the Austrian part of that corridor is entirely German, and of the Hungarian part chiefly German. The Jugo-Slav claims to the Bačka have more foundation, but cannot be admitted as a whole on a basis of nationality.

CAPT. J. K. DAVIS contributes to the *Geographical Journal* for January (vol. li., No. 1) a short account of the *Aurora* Relief Expedition to the Ross Sea in December, 1916, and January, 1917. The *Aurora* left Port Chalmers with Sir Ernest Shackleton on board on December 20, 1916. After entering the Ross Sea Capt. Davis skilfully avoided heavy ice by keeping to the west, and did not enter the pack until he reached 70° 20′ S., 175° 20′ E. Then followed five difficult days spent in traversing a belt of pack, 104 miles wide, after which the *Aurora* emerged into the open sea, and reached McMurdo Sound. Off Cape Barne fast ice extended across the sound on January 10. After the seven survivors of the expedition had been embarked, the ship crossed to Butter Point, where Sir Ernest Shackleton searched the coast fruitlessly for the two missing men. A further search at Cape Barne and Glacier Tongue resulted in no clue, and it was decided to return to New Zealand. Off Cape Adare heavy ice was encountered, to avoid which Capt. Davis returned southward and bore northward further to the east, thus passing through the pack and out of the Ross Sea. The *Aurora* returned to Wellington on February 9, 1917, and in June left New Zealand, homeward bound *viâ* Cape Horn. We regret to hear that no definite news has been received of her since her departure from New Zealand, and that there is little hope of her arriving in port. On her homeward voyage the *Aurora* was in command of Capt. Reeves.

THE thirty-first annual report of the Marine Biological Station at Port Erin shows that twenty-one workers have occupied tables in the laboratory during the past year, twelve of these being students who attended the course of instruction during the Easter vacation. The usual operations were carried on in the plaice and the lobster hatcheries. Nineteen plaice, hatched and reared during the season of 1914, and afterwards kept in the pond, spawned this season. These fish had attained an average length of 10½ in. It was noticed that their eggs were smaller than the average egg of the plaice, the proportions being as 5 to 6·5, but otherwise were normal. Appended to the report is an interesting address (30 pp.) by Prof. Herdman on "Sir John Murray, the Pioneer of Modern Oceanography."

THE annual report of the Scottish Marine Biological Association for 1916 gives an account of the work of the marine laboratory at Millport. During the year nine workers, in addition to students attending courses of instruction, occupied tables in the laboratory, and the report contains notes on some of the results of their investigations, especially noteworthy being those of Messrs. J. H. Paul and J. S. Sharpe on the deposition of lime salts in the integument of decapod crustacea, and the observations of Dr. J. F. Gemmill on the development of certain starfishes and sea anemones. The eggs of three species of anemones were obtained in the aquarium, and the larvæ reared either to the stage of fixation or to the final form in separate hatching vessels under aeration. In *Adamsia palliata* and *Actinoloba dianthus* it was found that the formation of the endoderm takes place by invagination, and that in the formation of the blastula of Tealia a much-folded stage occurs which does not appear to have been noticed previously.

THE courtship and subsequent events in the life-history of the moorhen during the breeding season are briefly and skilfully summarised by Miss Frances Pitt in *British Birds* for January. The aggressiveness of this species in asserting its territorial rights is well known. After observations extending over three seasons, Miss Pitt is confident that these rights are challenged, for the most part, by the young of the previous year. This is what one would have expected. Incubation appears to begin long before the clutch is complete, and during the whole period of sitting new material is constantly added to the nest, so that it has reached a considerable size by the time the last chick has hatched. The young remain for some days in the nest, where they are assiduously fed on insects by both parents. But they will drop out of the nest into the water on the slightest alarm; this leads to considerable and hitherto unsuspected mortality, for frequently the nursery is placed on the bough of a tree at some distance above the water. In such cases the nestlings are unable to return when danger is past, and speedily die of starvation. A second, supplementary, nest appears generally to be built for the use of the young, presumably after they have left the first to acquire the art of feeding themselves. Finally, some interesting observations are made on the loss of the brilliant coloration of the head which characterises the nestling of this species, in common with that of its ally, the coot.

WE have received vol. xiv., part ii., of the Proceedings of the Birmingham Natural History and Philosophical Society, which contains several interesting papers, and in particular "A Survey of the Flora of East Worcestershire," by Mr. John Humphreys, to which we would direct the attention of botanists and geologists in particular. A great number of different geological formations are represented in this district from Archæan rocks to the Lias, with several limestones of different ages, and the effect on the flora is very marked. This is especially noticeable on the calcareous rocks of the Lias, where a great collection of new forms crop up. At Droitwich, Hartlebury Common, and the Salwarpe valley an interesting set of maritime plants occurs, and though the theory that in late Pleistocene times the sea penetrated to the present 100-ft. level is not now generally accepted, the presence of such plants is difficult to explain. Birds and insects afford similar evidence, and certainly lend support to the view that estuarine conditions prevailed in the Severn Valley in recent geological times. Hartlebury

Common is a remarkable spot for the botanist, and is still fortunately an untouched and unspoilt piece of country. For this and other interesting places careful lists of the more uncommon plants are given.

CAPT. T. S. MASTERSON read a paper on "The Petroleum Industry of Rumania" before the meeting of the Institution of Petroleum Technologists on January 15, in which he presented a very useful summary of the position of this industry up to the time of the entry of Rumania into the European war. He gives a brief account of the geography and geology of the Rumanian oilfields, and discusses at some length the methods of exploitation employed. He shows why the American method of drilling has proved a comparative failure, whilst the Canadian method has proved very successful, and is preferred by most Rumanian operators. The percussive water-flush method has not fared much better than the American method, but, on the other hand, the modern rotary system has been highly successful in the loose sandy marls met with in certain areas. The author concludes that no one system can be advocated for general use in Rumania, but that in each case the system best adapted to the conditions must be selected, wherever these conditions are known; in unexplored fields he recommends the use of the percussion system. He states that Rumania possessed sixty-one refineries with a total capacity of 4½ million tons, whereas the highest output of crude oil obtained in any year was only 1·9 millions. He further directs attention to the fact that practically the whole of the plant for these refineries was supplied from Germany, together with most of the raw materials employed in the construction of drilling rigs. In November, 1916, when the retreat of the Rumanian Army became inevitable, the wells and refineries were destroyed as completely as possible, and the paper concludes with an expression of the hope that when the times comes for reconstruction Great Britain will take steps to see that she shall be in the position to furnish the requisite materials.

A NEW type of differential dilatometer for thermal investigations on steels is described in the September-October *Revue de Métallurgie*. The author, M. Pierre Chevenard, claims that the instrument is well adapted for use in a steel works laboratory on account of trustworthiness and simplicity of design. Only small quantities of metal are necessary; the instrument is easy to set up, and the readings are unaffected by vibrations. An instrument of the type he describes has been used for some time for routine tests in a large steel works in France. It provides a useful complement to the chemical and micrographic examination of certain steels and their constituents, such as cementite, etc. Finally, it has proved of value in the qualitative examination of slight modifications in the dilatability of metals due to thermal or mechanical influences. The author remarks, in conclusion, that the examination of these and certain other phenomena rightly comes within the scope of precise metrology.

THE following volumes are announced for early appearance in the "Collection Horizon" of Messrs. Masson et Cie., Paris :—"Les premières heures du Blessé de Guerre," P. Bertein and A. Nimier; "L'Evolution de la Plaie de Guerre," Prof. A. Policard; "Commotions et Emotions de Guerre," Prof. A. Léri and Th. Beck; "Traitement des Psychonévroses de Guerre," G. Roussy, J. Boisseau, and M. d'Œlsnitz; "Blessures du Crâne," T. de Martel (revised edition); "Blessures du Cerveau," C. Chatelin (revised edition); "Prothèse fonctionnelle en Chirurgie de Guerre," Ducroquet; and "Blessures de la Moelle et de la Queue de Cheval," Prof. G. Roussy and J. Lhermitte.

## OUR ASTRONOMICAL COLUMN.

ENCKE'S COMET.—The following continuation of the ephemeris of Encke's comet is from Mr Viljev's elements, and is for Greenwich midnight :—

| | R.A. | | | N. Decl. | |
|---|---|---|---|---|---|
| | h. | m. | s. | ° | ′ |
| Jan. 31 | 23 | 37 | 33 | 6 | 21 |
| Feb. 4 | 23 | 44 | 6 | 6 | 55 |
| 8 | 23 | 51 | 4 | 7 | 32 |
| 12 | 23 | 58 | 27 | 8 | 10 |
| 16 | 0 | 6 | 15 | 8 | 49 |
| 20 | 0 | 14 | 30 | 9 | 30 |
| 24 | 0 | 23 | 12 | 10 | 12 |
| 28 | 0 | 32 | 21 | 10 | 48 |
| Mar. 4 | 0 | 41 | 28 | 11 | 23 |

The magnitude was 15·0 on December 30, but may be expected to reach at least 9·0 by the end of February. In 1852, when perihelion was at about the same time of the year, the comet was visible in bright twilight in February, but it has probably declined in physical brightness since that date.

SOLAR OBSERVATIONS AT MADRID.—In addition to the usual convenient astronomical and meteorological tables, the "Anuario" of the Madrid Observatory for 1918 includes the detailed results derived from direct photographs of the sun, observations of solar prominences, and spectroheliograms of the sun's disc taken in calcium light. The sun-spot record is for 1916, and gives the heliographic latitude and longitude of each spot, together with its duration, area, and classification. The prominence catalogue is also for 1916, and includes position, extent of base, height, and brightness of each prominence observed. A similar catalogue of calcium flocculi covers the period from October 1, 1916, to September 30, 1917. In addition, there are valuable discussions of the distribution of each group of phenomena in regard to time and position on the sun. In the case of calcium flocculi, the discussion covers the whole period of observation at Madrid, and is of particular interest because so few data have hitherto been published. The unit of time adopted is that of the sun's rotation, and the following mean daily numbers of flocculi for approximate years have been calculated from the table given :—

| Period | Rotations | Days of observation | Mean daily number |
|---|---|---|---|
| 1912, Apr. 4–1912, Dec. 5 | 1–9 | 131 | 1·247 |
| 1912, Dec. 5–1914, Jan. 18 | 10–24 | 169 | 0·704 |
| 1914, Jan. 18–1914, Dec. 12 | 25–36 | 128 | 1·499 |
| 1914, Dec. 12–1915, Nov. 4 | 37–48 | 134 | 4·782 |
| 1915, Nov. 4–1916, Dec. 17 | 49–63 | 149 | 7·506 |

SPECTRA OF JUPITER AND SATURN.—A photographic investigation of the spectra of the planets Jupiter and Saturn has been made at Glasgow by Dr. L. Becker (Monthly Notices R.A.S., lxxviii., 77). The spectra extended from B in the red to K in the extreme violet, and were about 11 cm in length. Apparent absorption bands introduced by the dyes used to sensitise the plates were eliminated by the superposition of a positive photograph of the lunar spectrum. The only absorption band discernible in the spectra of the two planets is the well-known band in the red, which Dr. Becker finds to extend from λ 6174 to λ 6214. The supposition that water vapour is present in the atmospheres of these planets is not supported by the photographs in question, as the water-vapour lines near D do not differ in appearance in the spectra of the moon and planets.